The opinion in support of the decision being entered today is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HYUN-DOO SHIN, YANG-LIM CHOI,
BANGALORE S. MANJUNATH, and PENG WU

Appeal 2007-2011
Application 09/823,272
Technology Center 2600

Decided: September 26, 2007

Before JOHN C. MARTIN, ANITA PELLMAN GROSS,
and HOWARD B. BLANKENSHIP, *Administrative Patent Judges*.

GROSS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Choi, Manjunath, Shin, and Wu (Appellants) appeal under 35 U.S.C. § 134 from the Examiner's Final Rejection of claims 1, 3 through 8, and 10 through 13, which are all of the claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

Appellants' invention relates generally to an indexing method of a feature vector data space. *See* Specification 1:3-7. Claim 1 is illustrative of the claimed invention, and it reads as follows:

1. An indexing method of a feature vector data space in which a plurality of feature vectors are indexed, the indexing method comprising the steps of:

(pa-1) partitioning the feature vector data space into a plurality of cells having a uniform size;

(a) determining whether one or more cells from said plurality of cells, on each of which one or more of said plurality of feature vectors are correspondingly concentrated, exist; and

(b) hierarchically indexing the feature vector data space when it is determined that said one or more cells, on each of which said one or more of said plurality of feature vectors are correspondingly concentrated, exist in the step (a)

wherein, one or more feature vectors are concentrated in a cell when the cell contains more feature vectors than a predetermined threshold.

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

Kothuri US 6,381,605 B1 Apr. 30, 2002

Xia Wan et al., "A New Approach to Image Retrieval with Hierarchical Color Clustering," IEEE Transactions on Circuits and Systems for Video Technology 8:5, September 1998, pp. 628-43. (Wan)

Roger Weber et al., "A Quantitative Analysis and Performance Study for Similarity-Search Methods in High-Dimensional Spaces," Proceedings of the 24th International Conference on Very Large Data Base, New York, August 1998, pp. 194-205. (Weber)

Claims 1, 3, 7, 12, and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Wan in view of Kothuri.

Claims 4 through 6, 8, 10, and 11 stand rejected under 35 U.S.C. § 103 as being unpatentable over Wan in view of Kothuri and Weber.

We refer to the Examiner's Answer (mailed November 30, 2006) and to Appellants' Brief (filed October 16, 2006) and Reply Brief (filed January 30, 2007) for the respective arguments.

SUMMARY OF DECISION

As a consequence of our review, we will affirm the obviousness rejections of claims 1, 3 through 8, and 10 through 13. We also enter a new ground of rejection of claims 1, 3 through 8, and 10 through 13 under 35 U.S.C. § 101.

OPINION

Appellants contend (Br. 15-17 and Reply Br. 4-6) that Wan prefers cells of uniform size, whereas Kothuri divides data into subsets where each subset will fit into a leaf node regardless of cell size. Appellants contend (Br. 17) that modifying Wan with the teachings of Kothuri would render it unsatisfactory for its intended purpose. Thus, Appellants contend (Br. 17) that it would not have been obvious to combine the teachings of Wan and Kothuri. In addition, Appellants contend (Br. 17-18) that even if the references were combined, they would not suggest determining whether one or more of the uniform sized cells have a concentration of feature vectors and hierarchically partitioning them.

Wan discloses (631) that a simple uniform quantization has the advantage of being straightforward "in the absence of *a priori* information about the color distribution of the image database." However, color distributions are often nonuniform, and a simple uniform quantization scheme is inefficient for some color spaces (*id.*). Thus, Wan suggests at least beginning with a uniform quantization for simplicity, but suggests a nonuniform further breakdown of the color space. Kothuri discloses (col. 10, l. 42-col. 11, l.31) partitioning a data set repeatedly until each subdivision or cluster of data points can fit into a node of an R-tree. Kothuri teaches (col. 3, ll. 5-11) that the disclosed methods provide for efficient organization of the data to facilitate rapid retrieval. Thus, it would have been obvious to the skilled artisan to further partition those bins that have a cluster of data points.

The Supreme Court has held that in analyzing the obviousness of combining elements, a court need not find specific teachings, but rather may consider "the background knowledge possessed by a person having ordinary skill in the art" and "the inferences and creative steps that a person of ordinary skill in the art would employ." *See KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1740-41, 82 USPQ2d 1385, 1396 (2007). To be nonobvious, an improvement must be "more than the predictable use of prior art elements according to their established functions." *Id.* Here the combination proposed by the Examiner appears to be the predictable use of two organization methods, one after the other, according to their established functions. Accordingly, we will sustain the obviousness rejection of claims 1, 3, 7, 12, and 13, which were argued together as a single group. Further,

we will sustain the obviousness rejection of claims 4 through 6, 8, 10, and 11, for which no additional arguments were presented.

Under the provisions of 37 C.F.R. § 41.50(b), we enter the following new ground of rejection against Appellants' claims 1, 3 through 8, and 10 through 13 under 35 U.S.C. § 101 as being nonstatutory.

The Supreme Court has held that claims that, as a whole, are directed to nothing more than abstract ideas, natural phenomena, or laws of nature are not statutory under 35 U.S.C. § 101. *See Diamond v. Diehr*, 450 U.S. 175, 185, 209 USPQ 1, 7 (1981). An application of a law of nature or mathematical formula to a known structure or process, though, may be patentable. *Id.* at 187, 209 USPQ at 8. However, a process that comprises "no substantial practical application" of an abstract idea is not patentable, as such a patent would in effect be a patent on the abstract idea itself. *Gottschalk v. Benson*, 409 U.S. 63, 71-72, 175 USPQ 673, 676 (1972).

Clearly, the present claims recite neither a natural phenomenon nor a law of nature, so the issue is whether they are directed to an abstract idea. We note that it is generally difficult to ascertain whether a process is merely an abstract idea, particularly since claims are often drafted to include minor physical limitations such as data gathering steps or post-solution activity. However, if the claims are considered to be an abstract idea, then the claims are not eligible for and, therefore, are excluded from patent protection.

Claims 1 and 3 through 6 recite "an indexing method of a feature vector data space" and claims 12 and 13 recite a "method of searching for similarity in a feature vector data space." The claims do not require any type of machine, such as a computer. Thus, the methods appear to be disembodied concepts or abstractions. A programmed general purpose

machine which merely performs an algorithm has been held nonstatutory as an attempt to patent the algorithm itself, *see id.* and *In re de Castelet,* 562 F.2d 1236, 1243, 195 USPQ 439, 445 (CCPA 1977). We believe that a similar case exists for "manufactures" which store programs that cause a machine to perform an algorithm stored on a tangible medium.

Claims 7, 8, 10, and 11 are directed to computer-readable recording medium which store program codes that cause the machines to perform the indexing methods of claims 1 and 3 through 6. Thus, claims 1 and 3 through 6 are nonstatutory as being further attempts to patent the algorithms themselves.

Nonetheless, assuming *arguendo* that the claims are not solely directed to algorithms, the next question is whether the claimed invention is directed to a practical application of an abstract idea. "[W]hen a claim containing [an abstract idea] implements or applies that [idea] in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (*e.g.*, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101." *Diehr*, 450 U.S. at 192, 209 USPQ at 10. Also, according to the test set forth in *State Street Bank & Trust Co. v. Signature Finance Group, Inc.*, 149 F.3d 1368, 1374, 47 USPQ2d 1596, 1601-02 (Fed. Cir. 1998), the production of a useful, concrete, and tangible result equates to a practical application of an abstract idea.

In claims 1, 3 through 6, 12, and 13, we find no physical subject matter being transformed, just an abstraction. Further, although claims 7, 8, 10, and 11 recite that the items are computer-readable recording mediums, the program method steps performed by the program codes do not represent

physical subject matter. Thus, we find no physical subject matter being transformed.

We also find that the methods of claims 1 and 3 through 6 fail to produce a useful, concrete, and tangible result as a feature vector data space index is neither concrete nor tangible. Since the methods performed by the program code of claims 7, 8, 10, and 11 produce the same results as claims 1 and 3 through 6, they also fail to provide concrete and tangible results. Also, the result of claims 12 and 13, a cell in a feature vector data space, is neither concrete nor tangible. Accordingly, as claims 1, 3 through 8, and 10 through 13 fail to transform physical subject matter and fail to produce useful, concrete, and tangible results, they are abstract ideas that are nonstatutory under 35 U.S.C. § 101.

ORDER

The decision of the Examiner rejecting claims 1, 3 through 8, and 10 through 13 under 35 U.S.C. § 103 is affirmed. We also enter a new ground of rejection of claims 1, 3 through 8, and 10 through 13 under 35 U.S.C. § 101.

Regarding the affirmed rejections, 37 C.F.R. § 41.52(a)(1) provides "Appellant may file a single request for rehearing within two months from the date of the original decision of the Board."

In addition to affirming the Examiner's rejection(s) of one or more claims, this decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b).

37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

> (1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the Examiner, in which event the proceeding will be remanded to the Examiner. . . .
>
> (2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

Should Appellants elect to prosecute further before the Examiner pursuant to 37 C.F.R. § 41.50(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If Appellants elect prosecution before the Examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED
37 C.F.R. § 41.50(b)

KIS

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